Based on the FPI the Effective Reform of Computer Courses in Higher Vocational Colleges—Taking "Database Technology" Course as an Example

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Abstract. This paper analyzes the problems existing in the teaching process of the current database technology in Higher Vocational colleges. According to the guidance of FPI, we should reform the curriculum from many aspects, and continue to reconstruct the teaching process of database technology. Teaching practice shows that the teaching of database technology based on the FPI can achieve good teaching effect, It also provides a reference case for the curriculum reform of computer specialty in Higher Vocational Education.

Introduction

In recent years, the curriculum reform of vocational education has been carried out in various vocational colleges, and achieved a lot of results of curriculum reform. The learning effect of students has also been a certain degree of improvement. In the process of reform, the teachers of vocational colleges have studied advanced ideas and advanced teaching principles in many developed countries. In BTEC HND teaching I had witnessed 8 years. In the process of building the national backbone school, along with the course of studying the dual system vocational education in Germany, the teaching design of database technology course based on work study combination and project teaching method. No matter what kind of curriculum design patterns and methods, in the final analysis it is in line with the current social, political and economic situation of the country and the practical needs of education. Do not copy and use totally, but make education return to the state.

In recent years, the theoretical model of instructional design has soared, but there are some basic and common principles behind them. Dr. M. David Merrill, is a famous instructional technology and design theorist and educational psychologist, He summed up some famous teaching theories, such as constructivism, learning by doing, learning four components and so on many kinds of educational theories and viewpoints. In 2002, he put forward the principle of primary education (five star teaching principle) (FPI: First Principles of Instruction). As the essence of all kinds of theories, FPI becomes the first principle of instructional design.

First Principles of Instruction

The principle of teaching includes five main principles:

(1) Focus on solving problems: learning can be facilitated when teaching enables students to feel able to solve practical problems.

(2) Activate the existing knowledge: when teaching can activate the original knowledge and experience, and as the basis for learning new knowledge, to promote learning.

(3) Demonstrate the new knowledge: when teaching fully demonstrates the learning content rather than just using the teaching media to inform the relevant information, learning can be promoted.

(4) Application: when teaching encourages students to use new knowledge or new skills to solve problems, to promote learning.

(5) Integration: when teaching encourages students to master new knowledge skills (migration) to the daily practice, learning to get promoted.
Professor Merrill gave the corresponding inference for each basic principle. He firmly believes that the effectiveness of curriculum learning depends on the direct proportion of the adoption of first principles.

**Database Technology Curriculum Problems**

In 2013, according to the combination of work and learning and project teaching requirements, the course of database technology curriculum reformed. After the reform of the curriculum content has been greatly improved compared to the previous, and the project has been relatively close to reality. But there are still some problems:

(1) The combination of learning some distance from the student's study and life, students cannot understand the background and business. The use of the actual project is a good choice, but the enterprise project is far away from the students' learning and life, the students cannot fully understand the business operation of the full background and complex business rules.

(2) The application of the project teaching method is more blunt and rude. Project teaching method is a very effective teaching method, but its application also has certain preconditions. It is proved by practice that the method is very effective in the course of the comprehensive training for the senior students. But for the professional basic courses, students do not have the corresponding professional knowledge. So teaching in the application of project teaching method is farfetched and effect of students is not good.

(3) The details of the curriculum are too rough, the task arrangement is not enough. Some parts of the arrangement underestimate the role of theory. These lead to the students could complete the task under the leadership of the teachers, but in the new application of learning the transfer ability is poor. It is difficult to solve the problem independently by students.

**The Application of the Principle of Teaching to Improve the Curriculum**

In 2014, I came into contact with and studied the principle of first teaching, I marvel at the combination of theory and practice, and try to apply this theory to the reform of database technology.

**Problem Centered Situation**

In the choice of learning tasks, according to the principle of "proximity", the database of the educational management system, which is closely related to students' life, is most suitable for the teaching of database technology. At the same time, other students living close to the dormitory management system database, library management system database, e-commerce shopping website database are also more appropriate. Jonathan has pointed out that only when the learners feel that the problem to be solved is interesting, targeted, able to participate in it, he will be willing to undertake the task of learning.

Situational creation plays a vital role. In the creation of the situation, it is best to meet the following conditions:

1. Give the learner a specific identity. for example, in the design and development of educational management system database, the author gives the role of the database administrator to participate in the design and development of the database.

2. To have a detailed description of the background, reflecting the authenticity of the task.

3. To have a detailed description of the task. Including what needs to be done, who will do, what kind of tools and methods to use, the need to achieve what kind of effect, who should be evaluated and so on are described. At the same time according to the difficulty of the task. The task should be progressive and level, in the high-level task, requiring students to reflect more professional qualities, such as the spirit of inquiry, the ability to communicate with customers and self-learning ability.
**Activation**

German educator Diesterweg said: the art of teaching is not to teach skills, but to inspire, awaken and inspire. Activation is to establish the connection of new and old knowledge, lay a solid foundation for further study. At this stage, teachers should complete the following teaching activities:

(1) Stimulated recall old. To recall the old knowledge that has been learned and closely related to the current new knowledge learning. You can use the "advance organizer" or "icon activation" strategy. Before each course, each subject is taught by a teacher, to design a number of topics related to the subject to be taught, and to enable students to think and answer. For example, before explaining the database object, let students recall function in programming courses in learning, what kind of role function (a particular function), the characteristics (with no parameters, there is no return type) and function (to call) and other issues, to allow students to analogy study and its very similar database.

(2) Provide new experience. If the old experience of the learners and the new knowledge are not closely linked, it requires teachers to provide some relevant experience will experience the transition to the old learning content, and these experiences more intuitive, more specific. For example, in the understanding of the database index, let students think about the role of the book in front of the directory. The students' understanding and use of the catalogue is intuitive and specific, which is beneficial for students to learn the index object.

(3) Learning is facilitated when it is offered to students or students are encouraged to recall a knowledge structure that can be used to organize new knowledge. For example, in the database integrity of the unique key learning, has been learning in learning primary situation, need to set up similar key more functions, but the primary key in a table and there is only one, so that learners can think with primary key role similar but can contain multiple function keys. Thus stimulate students interest in learning.

**Demonstrate New Knowledge**

The demonstration of new knowledge is the main part of the teaching, and the teaching will be promoted when the teaching shows the students what they have learned instead of just telling them what they have learned.

(1) Determine the presentation content and method. Different types of learning outcomes need to adapt to the content of the display, different content and the need to match the presentation. On the basis of the selection of the content and the way of presentation, the teacher should choose the most appropriate way to prove the teaching content carefully. In database for learning content concepts, provide the positive counterexample, many aspects from the connotation and extension of the concept of the concept, types, advantages and disadvantages and application scope are described. In the process, try to visually show the steps; in the database, create database and user login account, division of authority and other operations, is a corresponding process, teachers can give students a direct demonstration. At the same time, detailed experimental guide book and process screen can help teachers to strengthen the guidance of students.

(2) Select media. Be based on the specific content and way to choose the media and the media combination. What teaching content suitable for what media show, which media will help students to learn. In the course of database technology, some of the principles of content are difficulty. This is the use of the production of multimedia animation, while some of the applications in life, the teaching effect will be significantly improved. At the same time, it is a good media selection for the practical characteristics of the course.

(3) Organization structure. In the study of database technology, the organization structure of the whole content of the course is set up firstly, and then, according to the organization structure, the organization structure of the chapter is established, and finally the organization structure of the course is established. Recommend the use of mind mapping software in the establishment of the
organization chart, we can clearly show the main content and structure of the course or the courses for teachers and students, let learners and teachers to carry out targeted learning objectives.

**Application**

At this stage, it is necessary to strengthen learning through practice and feedback.

1. According to different types of teaching results, choose different ways of practice. The database technology in the test using a combination of written examination, operation, practice and academic and other forms, to effectively test for different types of learning outcomes.

2. Timely feedback, decreasing guidance. Timely feedback is very effective to improve the performance of learners. Feedback is not only to inform the students about whether they are right or wrong, but also to guide them to find their own mistakes. In the process of learning, teachers should take the form of gradual reduction. With the deepening of the study, the learner's ability to improve gradually, the teacher should consciously "let go", in order to improve the learner's ability to solve problems independently.

3. The problem of change: when the learner answers a series of questions, the study will be promoted. Take a different characterization of the same content, through the change of form, increase the students' sense of fresh, but also the problems presented in front of learners from multiple perspectives, conducive to learning and understanding of learning content.

**Integration**

In the last stage of teaching, teachers should consciously guide the learners to integrate the new knowledge with the learners' real life.

1. The actual performance of learners. Provide opportunities for learners to demonstrate their learning outcomes. For example, after studying the design of educational management system database, make the students to analyze and design the electronic commerce website database, the learners can see their progress, will increase the confidence of learning and learning drive.

2. Guide learners to reflect. Self-reflection is a good way to improve learners' ability of comprehensive thinking. In the teaching design, the students are required to record the problems encountered in the experiment and the students themselves. Through error learning, students can be more impressed, and will guide them to reflect on the causes of the problem, to avoid making the same mistake again.

3. Encourage learners to create innovation. Encourage students on the basis of existing research results, can be closer to an attempt to innovate the knowledge and skills themselves. In the database after learning, encourage students to design a database can be more security mechanisms to ensure the safe, effective data conversion between or among different types of database or database and program, to cultivate students' thinking ability and innovation ability.

**The Effect of Curriculum Reform**

Since 2014, since the first principle of education through the application of database technology curriculum for teaching reform, the curriculum has achieved good teaching effect in the teaching practice, was named outstanding course in University at present, as a national resource library -- a professional application of big data in the construction course. At the same time, students' logical thinking ability, data analysis ability and engineering practice ability are greatly improved.

The students mentioned in the curriculum: feedback through the database course, I deeply appreciate the application of the database in me everywhere, and be able to apply this technology to solve practical problems in life and work through learning and training. I like to learn the content is no longer a tall but elusive feeling, but the knowledge and skills learned from life and applied to the actual work, aroused my interest in learning, good learning effect also let me have more confidence in their ability to learn.

Teachers through this reform, the ability of teaching design has been greatly improved, and now more from the learner's point of view, how to reform the teaching content and the flexible application of teaching methods, teaching to better serve students. Through the course of study, the
effective growth of students to teachers is the best compliment in the sense of achievement has been improved greatly. The level of teachers' engineering practice has been improved in more cases and training, and the professional skills have been greatly developed.

Summary

FPI provides a framework and guiding principle for primary education curriculum design, but in the specific operation, how to design the transfer of the learner has five star learning experience teaching, firstly, it requires teachers to have a deep understanding and application ability of teaching content. Whether it is the depth of knowledge, skill proficiency and difficulty, the depth of understanding and promotion, the arrangement of the task sequence, teachers need to have a solid background in engineering practice. Teachers need to take and use multiple applications in a variety of different backgrounds.

Through the FPI to reform the database technology courses, the teaching is more in line with the needs of teachers and students, and has improved teaching effectiveness.

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References


